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WPI Acc-No: 2002-195599/ **200225**

New bromofluorinated monomers, their copolymers and bromosulfonated fluorinated elastomers with very low glass transition for use in fabrication of e.g. hydrogen fuel cell membranes produced by crosslinking them

Patent Assignee: HYDRO-QUEBEC (HYDR-N); AMEDURI B M (AMED-I); ARMAND M (ARMA-I); BOUCHER M (BOUC-I); MANSERI A (MANS-I)

Inventor: AMEDURI B M; ARMAND M; BOUCHER M; MANSERI A

Number of Countries: 097 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200196268	A2	20011220	WO 2001CA878	A	20010612	200225 B
CA 2312194	A1	20011213	CA 2312194	A	20000613	200225
AU 200168869	A	20011224	AU 200168869	A	20010612	200227
EP 1289915	A2	20030312	EP 2001947073	A	20010612	200320
			WO 2001CA878	A	20010612	
US 20030181615	A1	20030925	WO 2001CA878	A	20010612	200364
			US 2003296833	A	20030306	
JP 2004502786	W	20040129	WO 2001CA878	A	20010612	200413
			JP 2002510414	A	20010612	

Priority Applications (No Type Date): CA 2312194 A 20000613

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

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JP 2004502786 W 108 C07C-021/18 Based on patent WO 200196268

Abstract (Basic): **WO 200196268 A2**

NOVELTY - New bromofluorinated monomers, methods of preparing

copolymers of them with brominated trifluorovinylic monomers optionally containing a sulfonyl group, the copolymers produced and elastomers prepared by crosslinking them.

DETAILED DESCRIPTION - The new compounds are of Formula (I).
F₂C=CFX(CY₂)_nBr (I)

X=H, null;

Y=H, F;

n=integer 0-10.

Preferred forms are of Formula (II), (II') and (II). F₂C=CF(CH₂)_nBr
(II)

F₂C=CFBr (II')

F₂C-CF(CH₂)₂Br (II)

Other monomers used are of Formula (III1), (III2) and (VI).

F₂C=CFORF1 (III1)

F₂C=CFORF2-G (III2)

FCX=CYZ (VI)

RF1=CnF_{2n+1};

RF2=CnF_{2n};

G=SO₂FCO₂R, P(O)(OR');

R=CpH_{2p+1};

p=integer 0-5;

R'=H, 1-5C alkyl;

X, Y, Z=H, F, Cl, CnF_{2n}=1;

X, Y, and Z are not simultaneously F.

Random copolymers produced are of Formula (IV), (V), (VII) and (VIII).

-(-(CF₂-CFBr)_n-(-CF₂CF(ORF-G))_m)_p- (IV)

-(-(CF₂-CF(C₂H₄Br))_q-(-CF₂CF(ORF-G))_r)_s- (V)

-(-(CF₂-CFBr)a-(CH₂CF₂)b-(-CF₂CF(ORF-G))c-)d- (VII)

-(-(CF₂CF(C₂H₄Br))e-(CH₂CF₂)f-CF₂CF(ORF-G))g-)h- (VIII)

RF=RF1, RF2;

m, n, q, r=integer;

n/m, q/r=2-23;

p, s=10-300;

a, b, c=integer;

b/a=0.1-15;

b/c=1-20;

d=15-150.

When RF is RF1, G is not present.

a fluorinated copolymer is prepared by radical copolymerization (I) with (III1) or (III2), (II') with (III1) or (III2) to give (IV), (II) with (III1) or (III2) to give (V) and a method of copolymerization comprising the reaction of (II') with (III1) and (III2) (VI) to give (VII) and (II) with (III1) or (III2) and (VI) to give (VIII). The copolymers are crosslinked to yield a bromosulfonated fluorinated elastomer. An INDEPENDENT CLAIM is included for a method of

crosslinking the sulfonyl groups of the claimed elastomers in the course of which at least some of the crosslinking bonds carry an ionic charge and which comprises contacting the polymer with a crosslinking agent to permit the reaction of two sulfonyl groups on adjacent polymer chains.

USE - The elastomers are used for the fabrication of membranes, polymer electrolytes, ionomers, parts of hydrogen or methanol fuel cells, to obtain sealing joints, torus joints, flexible hoses, pipes, pump bodies, diaphragms, piston heads for use in the aeronautical, petroleum, motor, mining and nuclear industries and for plasturgy.

ADVANTAGE - The copolymers have a very low glass transition temperature and produce elastomers having good resistance to acids, petroleum, and fuels and good handling properties. Tetrafluoroethylene is not used in their preparation.

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-(-(CF₂(CFBr)a-(CH₂CF₂)b-(CF₂CF(ORF-G))c-)d- (VII)

-(-(CF₂CF(C₂H₄Br))e-(CH₂CF₂)f-CF₂CF(ORF-G))g-)h- (VIII)

RF=RF₁, RF₂;

m, n, q, r=integer;

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p, s=10-300;

a, b, c=integer;

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b/c=1-20;

d=15-150.

When RF is RF₁, G is not present.

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